

Great Salt Lake Water Quality Standards Initiative

Utah Division of Water Quality
Salt Lake City, Utah

First Tasks

- Determining a Detection Limit for Measuring Selenium
- Determining the Concentration of Selenium in the Great Salt Lake



Sunset over the Great Salt Lake

Sample Collection



20 Liter Carboy

2 from 1 meter

2 from 7 meters

Pumping the “deep brine”.



**Tygon Tubing and
Peristaltic Pump**

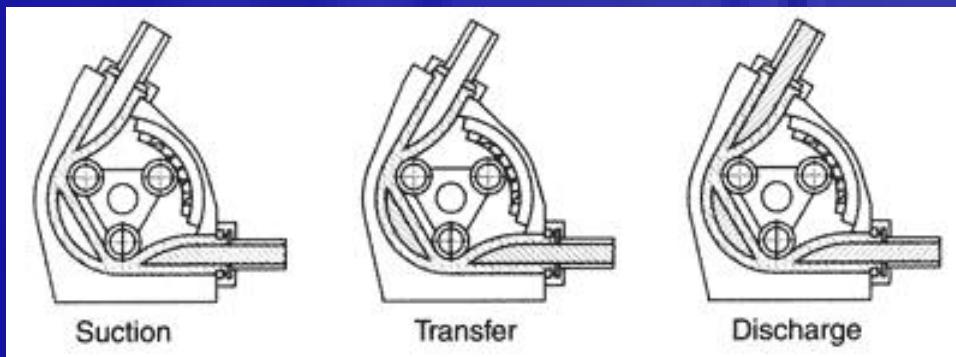


Figure 3

Sample Spiking and Processing

- Collect samples into Carboys (2 Levels)
- Send samples to ERM, Denver, Colorado
- ERM will spike samples at 3 levels in triplicate
- ERM will create 12 bottles for each level of the Great Salt Lake water
 - Lake Water (3)
 - 3 Spike Levels (3 x 3)
- Each Laboratory will receive 24 bottles.
- Results to be send directly to DWQ

Great Salt Lake Statistical Round Robin Design

1. Two Sample Locations

2. Triplicate Samples from each location

3. Three Spike levels for each location

3.a. Triplicates for each spike level

4. Spiking Levels Created by Random Generator

Location #1 = Gilbert Bay - 1 meter depth

Laboratory:	Laboratory Name			Method:	Describe
	Sample ID	Spike Level	Spike Value ug/L		
Sample #1	GSL	0	5	\$	-
Sample #2	GSL	0	89	\$	-
Sample #3	GSL	0	61	\$	-
Spike #1a	0-5	2	11	\$	-
Spike #1b	10-20	18	99	\$	-
Spike #1c	50-100	98	58	\$	-
Spike #2a	0-5	2	7	\$	-
Spike #2b	10-20	18	100	\$	-
Spike #2c	50-100	98	33	\$	-
Spike #3a	0-5	2	19	\$	-
Spike #3b	10-20	18	19	\$	-
Spike #3c	50-100	98	65	\$	-

Laboratories

Laboratories	ICPMS	ICPMS/DRC	Hydride	GFAA	ICPCMS/HPLC
American West		X		X	
Frontier Geosciences		X	X		
State Lab	X	X		X	
USGS				X	X
Kennecott		X	X		
University of Utah			X		

GFAA – Graphite Furnace Atomic Adsorption

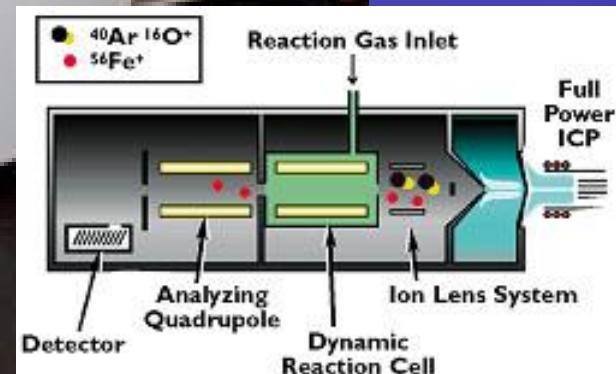


ICP-MS

Inductively Coupled Plasma Mass Spectrometer



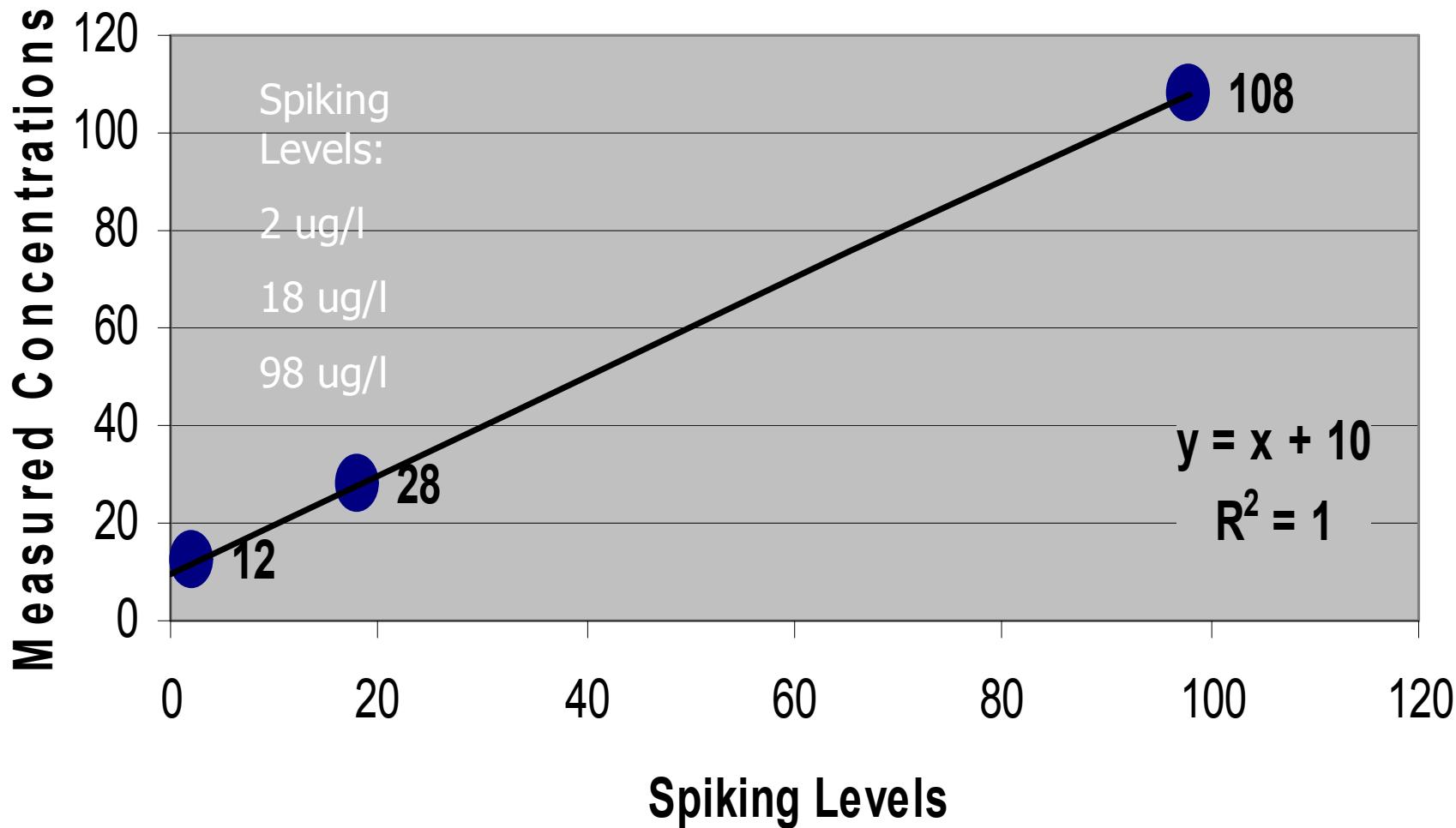
ICP-MS with Dynamic Reaction Cell (DRC)



Hydride Generation



Determining Detection Limits



Spike Level	Test 1	Test 2	Test 3	Average	Std.Dev.	2 Std.Dev.
0.0	10	4	8	7.3	3.1	6.11
2.0	16.0	10.0	13.0	13.0	3.0	6.00
18.0	25.0	22.0	27.0	24.7	2.5	5.03
98.0	108.0	109.0	107.0	108.0	1.0	2.00

